is there any record of its having presented unusual features at its appearance in 1847. It will be observed as long as possible, of course, in order to furnish observational material with which to determine the time of its next apparition.

The third comet of 1919 was also discovered by Rev. Joel H. Metcalf. This comet was likewise unexpected, and is, so far as we know now, new.

At discovery it was in the constellation *Bootes*. The motion, in comparison to Metcalf's first comet, is rather slow. It has been moving slowly southeastward, and by the first of October it will have moved from *Bootes* into the southwestern part of *Serpens*.

Preliminary elements for this comet were also determined at the Lick Observatory by Miss M. L. Heger and the writer. These elements suffice to show the principal characteristics of the orbit. Deviation from a parabola is not yet manifest, tho with a longer arc it might become so. The perihelion passage, or closest approach to the Sun, does not occur till December 18th, and the distance from the Sun is about 150,000,000 miles. At the present time the comet is slowly approaching the Earth also, but after the first part of October the distance will increase. At the present time the distance is about 230,000,000 miles.

In appearance it is very different from Metcalf's first comet, in that it has a sharp nucleus. The surrounding nebulosity is more condensed, but there is no tail. In brightness it seems to be equal to an 8th magnitude star.

The comet will be followed for some time before it is lost in the rays of the Sun. Not till early next year will it be beyond the Sun in the morning sky and it will then be far south and at a great distance from the Earth. Perhaps it may be observed at some southern observatory.

H. M. JEFFERS.

Lick Observatory,
September 20, 1919.

MEASURES OF THE DISK SURROUNDING NOVA AQUILAE, NO. 3

Nova Aquilae was examined with the 36-inch refractor on four nights from August 17th to September 4th, using the 520 and 1000-power eye-pieces. At the ordinary stellar focus the nova appears as a yellow-white star surrounded by a bluish-green nebulous atmosphere which forms a halo more than five seconds of arc in

diameter. When the focussing tube is drawn out the enveloping halo reduces in size and is condensed to a vivid bluish-green disk in which the out of focus image of the star is entirely lost, except for a faint yellowish fringe to the disk. The green color is of course due to the fact that the nebulium bands (centers at 5007A and 4959A) are by far the strongest in the spectrum of the disk.[1]

The disk is reduced to its minimum size when the tube has been drawn out about 0.3 inches (8 mm.). It is then approximately circular in outline and its surface is of nearly uniform brightness. At moments it has a slightly mottled appearance, perhaps due to out of focus light from the central star.

On two nights micrometer measures were made to determine the diameter of the disk at its sharpest focus and to see whether or not there was any departure from circularity. The results are as follows, the figures in degrees giving the position angle of the diameter measured.

	202°	157°	112°	67°	Mean
August 20	2″.44	2″.22	2″.34	2″.42	2″.36
	180°	135°	90°	45°	
September 2	2″.45	2″.34	2″.33	2″.40	2″.38

Particular care was taken not to over-measure the diameters, but it is possible that the out of focus image of the star affected the apparent size of the disk to a slight extent. The error of measure due to this cause can hardly exceed one or two tenths of a second of arc, so it is safe to say that the diameter of the true disk is greater than 2 seconds of arc. It will be noticed that the measures indicate a somewhat greater diameter in the south preceding-north following direction than at right angles to this position. The differences, however, are but little larger than the probable error of measure and may have no significance.

A comparison of my measures with those made by Barnard[2] in October–December, 1918, indicates an increase in the size of the disk, a conclusion that is made more probable by an examination of Barnard's individual measures. His general mean is 1″.18, but the three measures in October give 0″.65, the two in December (made when the object was very low in the sky) 1″.84, while those in November give intermediate values.

ROBERT G. AITKEN.

September 8, 1919.

[1] See the article by Moore and Shane on page 269 of this number.
[2] *Astrophysical Journal*, **49**, 199, 1919.

Three New Planetary Nebulae

During the past summer I have included in the observing list of the Crossley reflector a number of objects very close to the plane of the Milky Way. The descriptions of the objects in the NGC were of such a character as to raise the suspicion that these might be faint clusters, or even spirals. Most of these nebulae have proved to be of the diffuse type; one or two are faint star clusters. Three nebulae, from the evidence of their form, are undoubtedly planetary nebulae.

NGC I 1295; $18^h49^m.2$; $-8°55'$.
Exceedingly faint; a faint, hazy ring about $2' \times 1'.5$, in p. a. $90° \pm$. The central portions are relatively vacant, and it is fainter along and at the ends of the major axis. There are three faint stars at the center, of which one is probably the central star.

NGC 6842; $19^h50^m.9$; $+29°1'$.
Very faint. It is about $50'' \times 45''$, showing traces of an irregular ring formation. It has a central star of about the 13th magnitude.

NGC 7048; $21^h10^m.7$; $+45°53'$.
A rather faint oval, with slight traces of ring structure. It is about $60'' \times 50''$ in p. a. $20° \pm$. The brightest portions are at the east end of the minor axis. There is a very faint central star.

The spectrum of NGC 7048 has been examined visually with the 36-inch refractor by Messrs. Campbell and Moore, and found to be gaseous.

Heber D. Curtis.

September, 1919.

The Orbit of the Visual Binary System β 1111

One of the practical exercises assigned to my class in the theory of orbits of binary stars at the recent Summer Session of the University of California was the computation of the orbit of β 1111 by the Glasenapp-Kowalsky method. The four members of the class were encouraged to draw many apparent ellipses and to use each his own judgment as to the ellipse best satisfying the observed distances and the law of areas. The result was the four independent sets of elements which follow:

	M. V. Cannon	H. C. Hicks	J. F. Pobanz	H. G. Wrocklage
$P=$	42.18 yrs.	39.26 yrs.	39.67 yrs.	42.07 yrs.
$T=$	1917.87	1919.35	.1918.90	1918.20
$e=$	0.248	0.222	0.234	0.245
$a=$	$0''.220$	$0''.412$	$0''.241$	$0''.244$
$\omega=$	$137°.4$	$165°.7$	$146°.3$	$135°.4$
$i=$	34.8	34.8	43.0	45.85
$\Omega=$	43.5	37.8	46.0	46.7